SPECIFICATION

To all whom it may concern:

Be it known that Floyd A. Colibert, a citizen of the United States of America, has invented a new and useful invention entitled LOAD LEVELING WEIGHT DISTRIBUTING HITCH SYSTEM of which the following comprises a complete specification.

LOAD LEVELING WEIGHT DISTRIBUTING HITCH SYSTEM

Background of the Invention

Field of the Invention. This invention relates to hitch systems for trailers. More specifically, this invention relates to hitch systems for ball-type couplers, which provide for load leveling, weight distribution, tilt angle ball adjustment, a new and improved means for installing and removing the spring bar components of the invention as well as a new and improved device for lifting and securing the spring bar components of the invention.

Description of the Related Art. A variety of hitch assemblies for evenly distributing the tongue weight of a trailer are well known in the art. Commonly such hitch assemblies include a hitch head, spring bars, bar restraining sockets, and lift units. The head provides the ball mount, the towing vehicle attachment and spring bar attachments. Typical such hitch assemblies use substantially L-shaped spring bars, or use substantially rectangular sockets. Also, if ball pivot adjustment is provided, it requires that the user unbolt, remove and relocate the hitch head. Such existing load leveling or weight distributing hitches are generally mechanically complex with a large number of bolt and nut attachment to fix the hitch together. Mechanical complexity has the disadvantage of being generally less reliable. Also, a disadvantage of the prior weight distributing hitches is that it is relatively difficult for the user to attach the spring bars to the hitch head or for the user to remove the spring bars from the hitch head. This problem makes it significantly more difficult for the user to attach a trailer to a towing vehicle using load leveling hitches. Prior load leveling hitches provide limited or no tension adjustment capability.

For general background material, the reader is directed to United States Patent Nos. 3,645,560, 3,649,046, 3,679,231, 3,690,699, 3,692,331, 3,700,261, 3,700,262, 3,730,554,

3,731,746, 3,731,950, 3,778,088, 3,779,407, 3,825,132, 3,847,228, 3,871,686, 3,910,604, 3,964,768, 3,948,567, 3,989,269, 4,023,863, 4,025,085, 4,049,288, 4,053,174, 4,165,885, 4,198,073, 4,211,427, 4,213,627, 4,275,897, 4,312,516, 4,411,444, 4,637,770, 4,687,219, 4,711,106, 4,714,265, 4,722,542, 4,815,752, 5,184,839, 5,284,038, 5,363,924, 5,375,867, 5,421,599, 5,451,088, 5,454,550, 5,465,991, 5,489,111, 5,536,131, 5,562,298, 5,575,492, 5,580,076, 5,615,813, 5,628,525, 5,647,603, each of which is hereby incorporated by reference in its entirety for the material disclosed therein.

Summary of the Invention

It is desirable to provide a load leveling weight distributing hitch system for use in towing trailers where the attachment and removal of the spring bars is facilitated and can be accomplished by hand. Moreover, it is desirable to provide a load leveling weight distributing hitch system which provides the capability of spring bar tension adjustment. It is also desirable to provide a load leveling weight distributing hitch system which provides a thumb screw adjustment of the ball hitch pitch.

Accordingly, it is an object of this invention to provide a load leveling weight distributing hitch system which provides a quick connect, quick disconnect for the spring bars.

It is another object of this invention to provide a load leveling weight distributing hitch system which provides the capability of adjusting the tension of the spring bars.

A further object of this invention is to provide a load leveling weight distributing hitch system which provides a thumb screw adjustment for the pitch of the ball hitch.

It is a still further object of this invention to provide a load leveling weight distributing hitch system with enhanced strength.

Another object of this invention is to provide a load leveling weight distributing hitch system with enhanced reliability by minimizing the use of attachment bolts.

These and other objects of this invention, which are readily apparent to those of ordinary skill in the art upon review of the following specification, drawings and claims, are achieved by a device which is described in the specific embodiment of this invention. Specifically, a hitch head is provided with a ball hitch attachment point, a towing vehicle attachment, two T-socket posts, two T-sockets, two spring bars having attachment points for stabilizer chains, and two lift units for imposing tension on the spring bars. Innovations in this design include a quick connect/disconnect for the spring bars, a tension adjustment system, and a thumb screw device for adjusting the pitch of the ball hitch.

Brief Description of the Drawings

Figure 1 is a system drawing showing two view of the load leveling weight distributing hitch system being used to connect a towing vehicle to a trailer.

Figure 2 is a detail drawing showing five views of the preferred embodiment of the hitch head component of the invention.

Figure 3 is a detail drawing showing three views of the preferred embodiment of the post component of the invention.

Figure 4 is a detail drawing showing two views of the preferred embodiment of the T-socket component of the invention.

Figure 5 is a detail drawing showing two views of the preferred embodiment of the spring bar component of the invention.

Figure 6 is a detail drawing showing three views of the preferred embodiment of the

spring bar lift component of the invention.

Figure 7 is a detail drawing showing two views of the preferred embodiment of the spring bar lift lock component of the invention.

Detailed Description of the Invention

This invention is a load leveling weight distribution hitch which uses a quick connect, quick disconnect spring bar attachment, a thumb screw ball hitch pitch adjustment, a spring bar lift having the ability to adjust the tension imposed on the spring bar, and spring bar lift lock, to provide a new hitch design which provides enhanced strength, reliability, ease of use and adjustments over weight distributing hitches in prior use.

Figures 1a and 1b depict the load leveling and weight distributing system showing the hitch being used to connect a towing vehicle to a trailer. Figure 1a is a view from above the system of the invention. Figure 1b is a side view showing the left side of the invention. The towing vehicle 105 has a standard hitch receiver 106 which is attached to an adjustable shank 110 which is fixed by bolts 112, 113 to the hitch head 101 of the invention, which in turn has two "T" sockets 102a, 102b. Each "T" socket 102a, 102b is shown having received the spring bars 104a, 104b. Each spring bar 103a, 103b has a chain 111 attached to its trailer end 114. The chain 111 is provided to control trailer sway. It 111 is connected to the trailer tongue 107 via a spring bar lift 104a, 104b. The spring bar lift 104a, 104b, has a sway control bracket 115 which is provided to keep the chain 111 fixed in place, thereby controlling the trailer sway. The trailer tongue 107 is connect to the hitch head 101 by a standard ball 108 and socket 109 connection. In the preferred embodiment of the invention, the component parts of the invention are composed of steel, although alternative materials, including synthetics may be used without departing from the

concept of the invention.

Figures 2a, 2b, 2c, 2d, and 2e show the detail drawing of five views of the preferred embodiment of the hitch head 101 component of the invention. Figure 2a shows a top down view of the hitch head 101. Figure 2b shows a section view along the line A-A of the hitch head 101. Figure 2c shows the side view of the hitch head 101. Figure 2d shows the rear view of the hitch head 101. And figure 2e shows the front view of the hitch head 101. The preferred hitch head 101 has a top surface 204 in which three openings are provided, a ball hitch attachment opening 202, two T-socket post holes 201a, 201b, two shank mount plates 203a, 203b, each of which has two bolt openings 208, 209 for fixing the hitch head 101 to the adjustable shank 110. It can be seen that the top bolt opening 208 is provided as a slot which provides the user/installer with the capability of adjusting the pitch of the hitch head 101. Ball hitch 108 adjustment is provided by a thumb screw 206 which is installed through a threaded opening 209 and which by being turned by the user/installer the relative pitch of the ball can be adjusted. In one preferred embodiment of this invention, a sway control adjustment plate 210 is provided, fixed to the bottom of the hitch head 101 by bolts provided through bolt openings 212 and fixed to the bottoms of the T-socket posts by bolts provided through bolt openings 211. A variety of hitch head sizes can be employed depending on the ball hitch, trailer tongue and desired spring bar pitch and tension, without departing from the concept of this invention.

Figures 3a, 3b, 3c and 3d are detail drawings of the preferred embodiment of the post component of the invention. Figure 3a shows a side view of the T-socket post 301, showing the T-socket rotation slot 302. Figure 3b shows the top down view of the preferred T-socket post 301. Figure 3c shows a section view of the post 301 along the A-A section. Figure 3d shows a

side view of the T-socket post 301 which shows the T-socket installation slot 304. The post 301 is provided with a tapered end 305 which is press fitted into the post opening 201 of the hitch head 101. Once press fitted in, the post 301 is welded securely into place. A bolt hole opening 303 is provided in the event the sway control plate 210 is used. When installed each T-socket 102 is provided with a pin which passes through an opening in the T-socket to the T-socket rotation slot 302. This combination of the T-socket pin and the T-socket rotation slot provides the capability of rotating the spring bars 103 away from the trailer, thereby aiding in the installation and removal of the spring bars 103. The T-socket installation slot 304 is provided in order to allow the T-socket 102 to be installed on the post 301. Preferably, the post 301 is made from polished high strength steel. Alternative materials could be used without departing from the scope of this invention.

Figures 4a and 4b provide detail drawings showing two views of the preferred embodiment of the T-socket 102 component of the invention. Figure 4a shows a top down view of the T-socket 102, while figure 4b shows a section view along the A-A line. A tube opening 401 is provided, which is installed over the post 301. A spring bar opening 402 is provided to receive the first end of the preferred spring bar 103. The pin opening 403 is provided to interact with the T-socket pin and the T-socket rotation slot 302 to permit the T-socket 102 to rotate about the post 301. A set screw opening 404 is provided to fix the T-socket pin in place. Also, provided in the T-socket is a retainer pin opening 405. The use of a retainer pin 406 which is held in place by a spring 408 pinned 407 to the T-socket, provides the quick connect/quick disconnect feature of the invention. This is accomplished in combination with the retainer pin slot 502 of the spring bar 103. When the spring bar 103 is installed in the T-socket 102 it is

pushed straight in forcing the retainer pin 406 up and then down into the retainer pin slot 502. The retainer pin 406 being sprung to allow movement only on the insert of the spring bar 103 fixes the spring bar 103 in the T-socket. To remove the spring bar 103, it is rotated in either direction. Rotation of the spring bar 103 causes the retainer pin slot 502 to force the retaining pin 406 upwards, thereby releasing the spring bar 103. In the preferred embodiment of the invention the T-socket is pitched downward to induce tension in the spring bar 103. The preferred T-socket is composed of cast steel, although alternative materials could also be used without departing from the scope of this invention.

Figures 5a and 5b provide detailed drawing of the preferred embodiment of the spring bar component 103 of the invention. Figure 5a show the top down view of the preferred embodiment of the spring bar component 103 of the invention. Figure 5b shows the side view of the spring bar 103. The retainer pin slot 502 is shown for use as described above. A taper 505 is provided on the first end 501 of the spring bar 103. This taper 505 provides the means whereby the retainer pin 406 is forced upwards, allowing the spring bar 103 to be inserted and locked in place within the T-socket 102. The second end 503 of the spring bar 103 has two holes 504a, 504b which provide an access for attaching a tension chain 111. In the preferred embodiment of the invention, the spring bar 103 is made of steel, although alternative materials could be used without departing from the concept of this invention.

Figure 6 is a detail drawing showing three views of the preferred embodiment of the spring bar lift component of the invention. Figure 6a shows a top down view. Figure 6b shows a front view and figure 6c shows a side view. The spring bar lift 104 is an improved version of commonly known spring bar lift type devices. The purpose is to receive one or more chain links

into the opening and then to leverage the lift upwards, using a bar or other equivalent means, thereby locking the chain to the lift in a fixed position. Two important improvements to previously known spring bar lifts are provided in this invention. First, a chain retention loop 602 is provided to maintain chain tension in a sway. Second, an improved lift lock 603 is provided. Additional detail on the improved lift lock 603 is provided below. Other features of the spring bar lift 104 include: a clamp devices 604 for fixing the lift 104 to the trailer tongue 107; an inverted U-shaped element 605 adapted to fit over the trailer tongue 107; and a pivotable chain latch 606 which pivots about a pivot point 607.

Figures 7a and 7b are detail drawings of the preferred embodiment of the lift lock component 603 of the invention. Figure 7a is a side view and figure 7b is a section view cut along the A-A axis. The preferred embodiment of the lift lock has an exterior body 701 within which is installed a pivot pin 703 which in turn is held in a normally locked position by an internal spring 706 by pressure imposed on a piston 707 affixed to the locking post 702. In the normally locked position, the locking post end 702 engages an opening 608 in the pivotable chain latch 606. However, when the post 704 is rotated by the user along the tapered section 705 of the body 701 of the lift lock 603, the locking post 702 is withdrawn from the opening 608, thereby releasing the pivotable chain latch 606, and relaxing the tension on the chain 111.

The described embodiments of the invention are to be considered in all respects as illustrative only and not as restrictive. Although the embodiments shown here describe materials and specific interrelationships, these are to be considered only as descriptive of the current best mode of the invention as known to the inventors at the time the patent application is filed. The scope of this invention is, therefore, indicated by the appended claims rather than by the

foregoing description. All changes which come within the meaning and equivalency of the claims are to be embraced within their scope.